

Reducing heavy truck front crash involvement with crash avoidance technology

Southeast CMV Summit

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Saving lives. Preventing harm.

IIHS-HLDI mission:

To reduce deaths, injuries and property damage from motor vehicle crashes through **research and evaluation** and through **education** of consumers, policymakers and safety professionals.

Crash tests



Research



IIHS-HLDI reducing harm

Track tests



Communication

WTJR August 19, 2021
Yes, Carmel's roundabouts have a huge impact in reducing crashes

STREETS BLOG USA August 10, 2021
Study: Protected Bike Paths Saved Lives During COVID

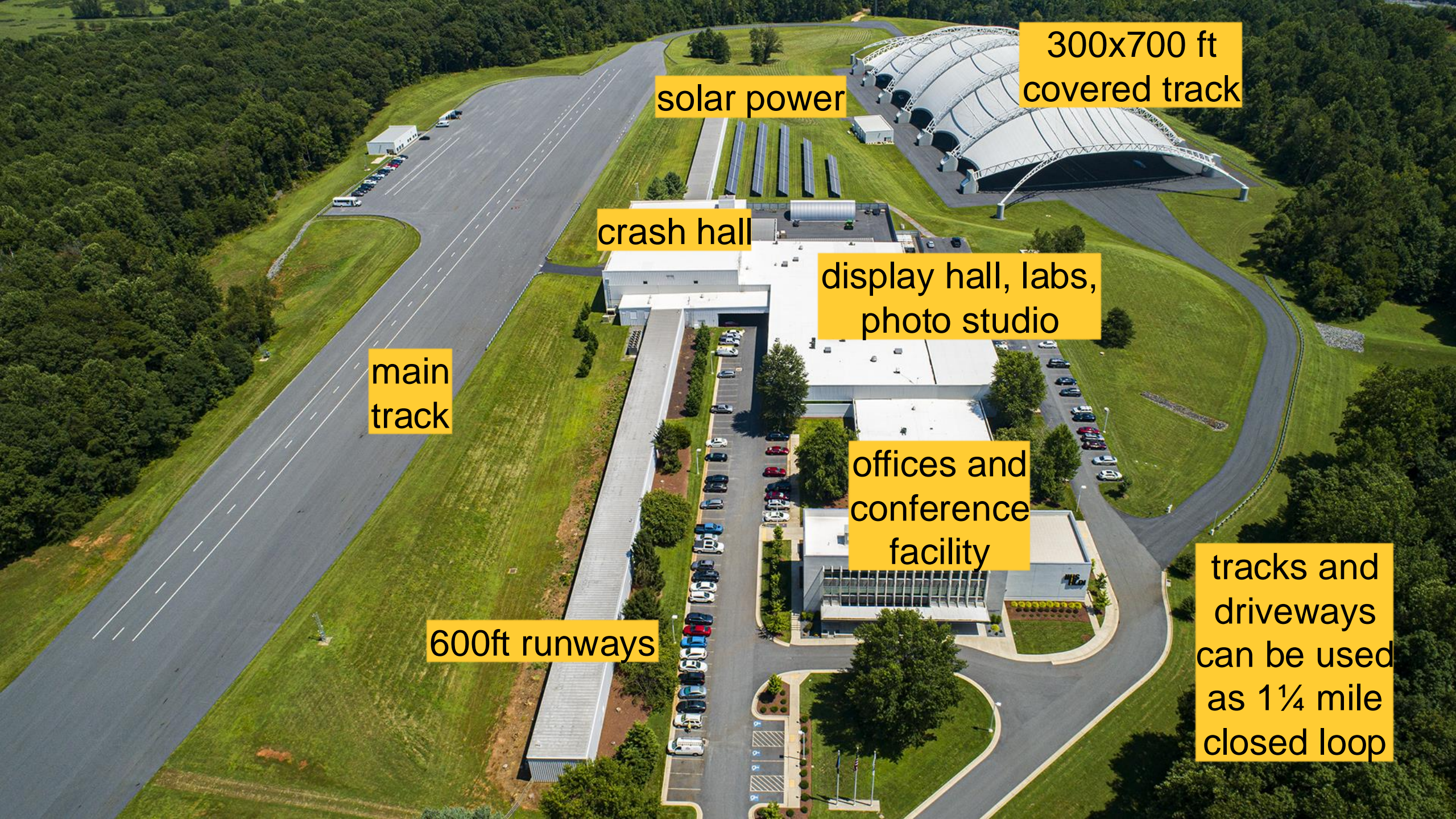
DETROIT FREE PRESS May 3, 2021
2021 Bronco Sport crushes its crash tests, reaches Mt. Everest of safety ratings

THE BRAKE REPORT September 1, 2021
IIHS: Adaptive cruise control, Level 2 Pilot Assist ADAS often inactive on sharp curves

THE BRAKE REPORT September 1, 2021
Study by IIHS Shows Motorcycle ABS Saves Lives

ROAD SHOW (CNET) September 21, 2021
Volkswagen ID 4 nabs coveted IIHS Top Safety Pick Plus award

CLAIMS JOURNAL September 13, 2021
Advanced Safety Equipment Slashes Young Driver Claim Rates More Than Half



solar power

300x700 ft
covered track

crash hall

display hall, labs,
photo studio

main
track

offices and
conference
facility

600ft runways

tracks and
driveways
can be used
as 1¼ mile
closed loop



42 staff members



75 staff members

Effectiveness of front crash prevention systems on large trucks

Front crash prevention effectiveness



Front crash prevention effectiveness



Front crash prevention effectiveness





BRAKE OFF
 ABS OFF
 ATC OFF
 CRUISE CONTROL ON
 DRIVER SEAT BELT N/A



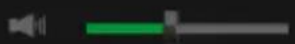
THROTTLE 100%
 ENG LOAD 58%
 PTO N/A
 ENGINE N/A
 ENG RETARDER N/A



FORWARD /
 BACKWARD
0.01
 SIDE TO SIDE
0.00



2:39:31.00 PM

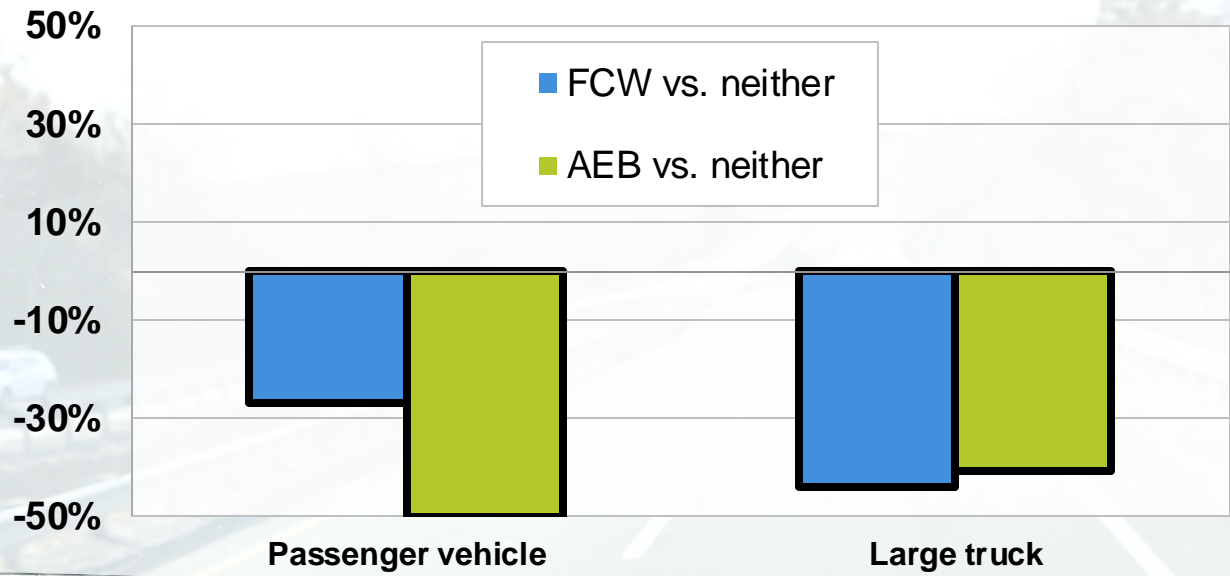


MAP **CHART** SELECT ANY 2 OPTIONS ▾

FOLLOWING TIME (SD) FOLLOWING TIME (ECM) TIME TO COLLISION FORWARD / BACKWARD SIDE TO SIDE

Effects on front-to-rear crash rates

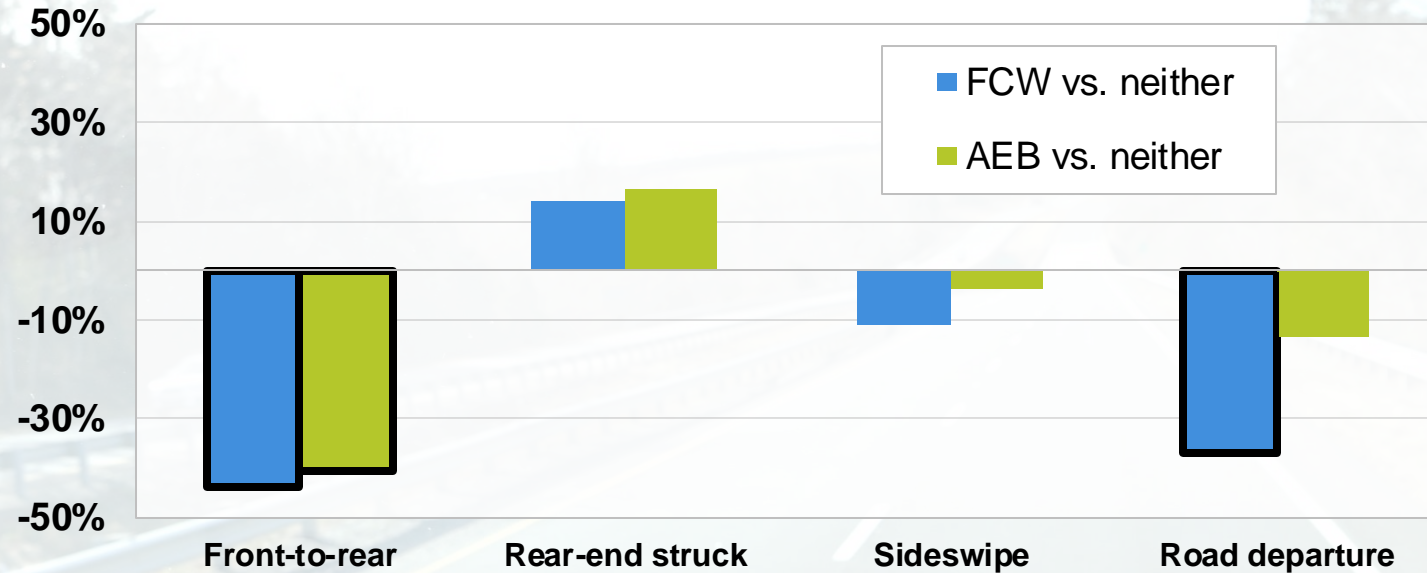
Police-reportable crashes



Outline box = statistically significant

Effects on relevant crash types

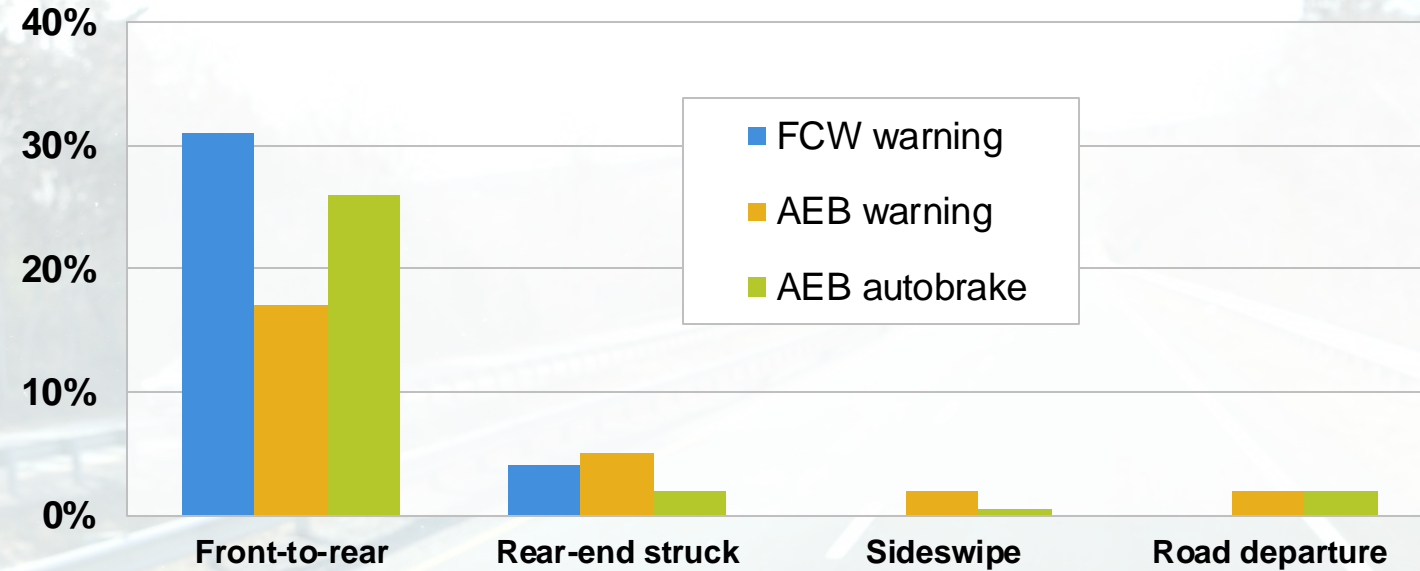
Police-reportable large truck crashes per mile traveled, 2017–19



Outline box = statistically significant

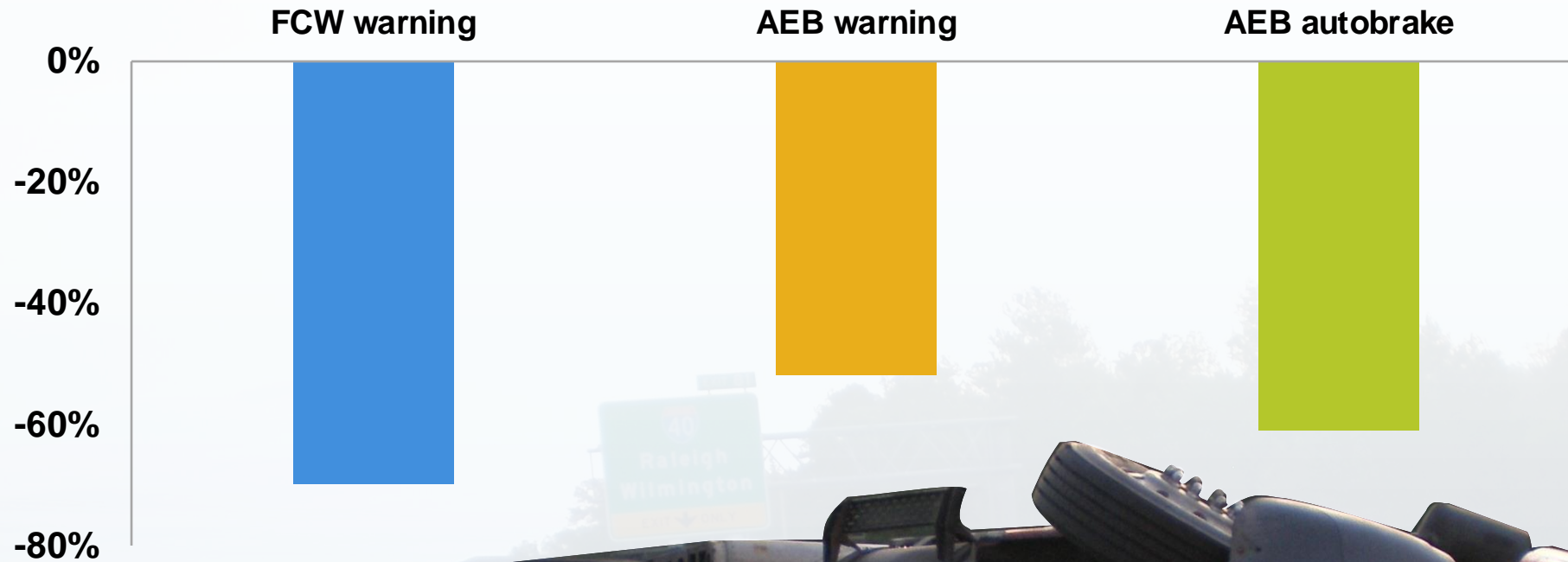
Warnings and autobrake interventions in relevant crash types

Police-reportable large truck crashes, 2017–19



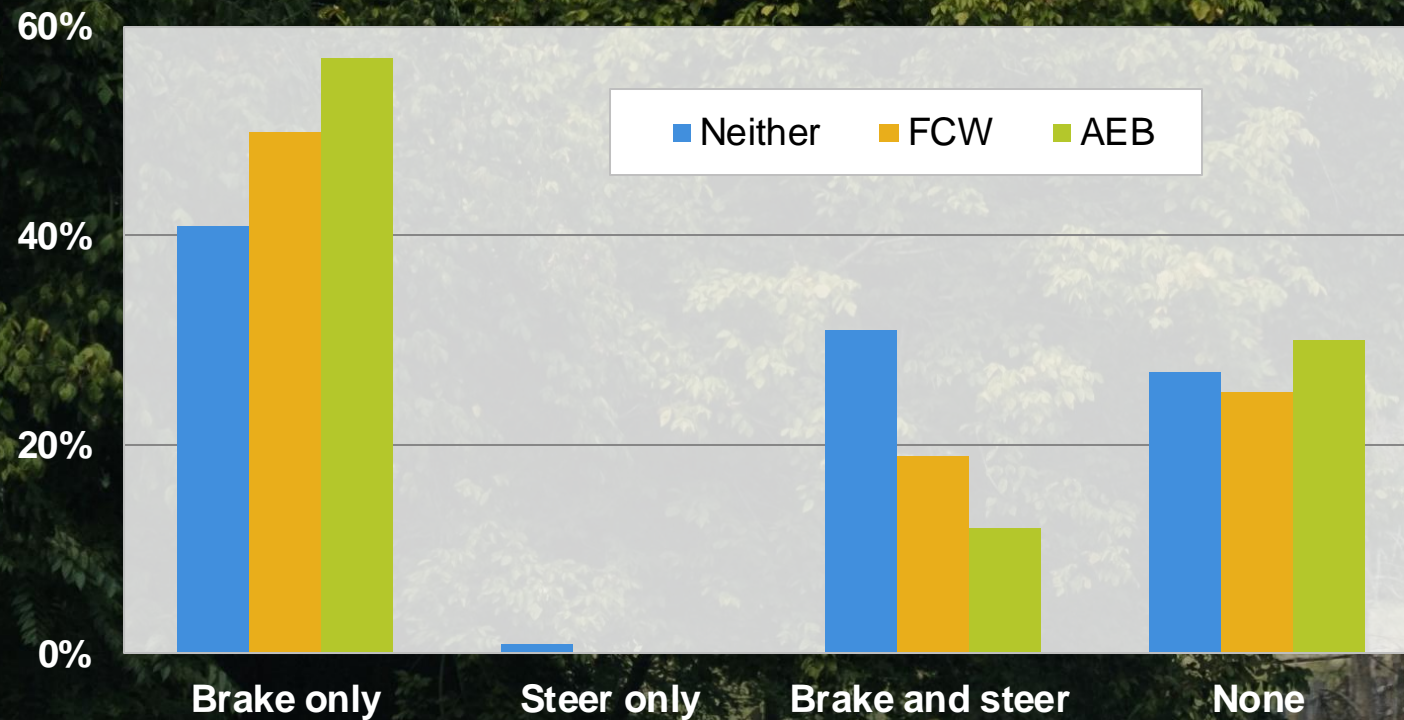
Speed reduction between intervention (warning or autobrake) and impact in front-to-rear crashes

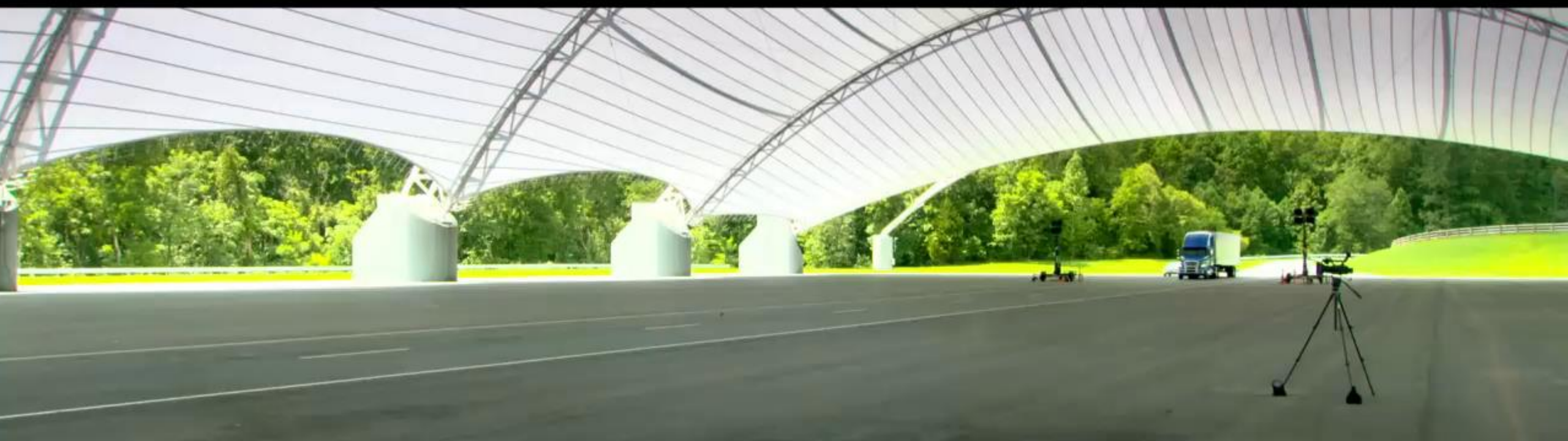
Police-reportable large truck crashes, 2017–19



Driver-attempted avoidance maneuvers in front-to-rear crashes

Police-reportable large truck crashes, 2017–19





Effectiveness of front crash prevention systems on passenger vehicles



Police-reported rear-end crashes

59% occur on **48-72 km/h** roads

Medium or heavy trucks struck in

32%

of fatal rear-end crashes



Motorcycles struck in

11%

of fatal rear-end crashes

Original vehicle-to-vehicle front crash prevention tests

20 km/h and 40 km/h

Relevant to 3% of police-reported rear-end crashes and less than 1% of fatal rear-end crashes in the U.S.

Superior Advanced Basic

Updated front crash prevention system evaluation

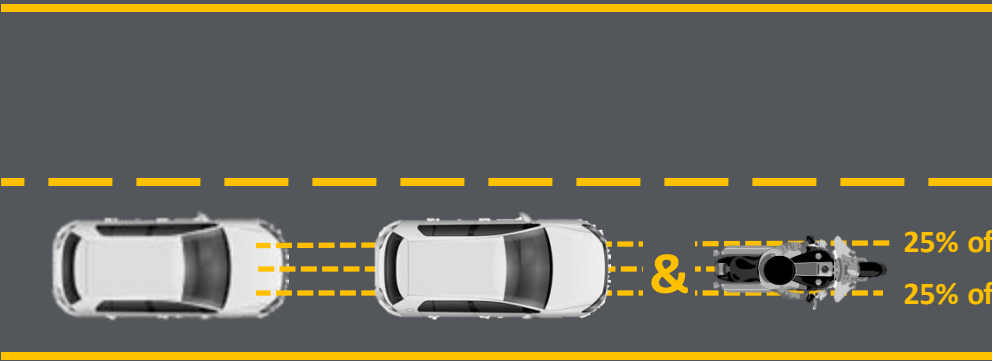
50 km/h



60 km/h



70 km/h



25% of vehicle width
&
25% of vehicle width



Front autobrake and reductions in rear-end crashes

IIHS study of more than 160,000 crashes finds today's **front autobrake systems** are **less effective** at reducing rear-end crashes **with medium/large trucks and with motorcycles**, compared with other passenger vehicles.



-53%
with other
passenger vehicles

VS.



-38%
with medium
or heavy trucks



-41%
with motorcycles

Small SUVs

2023 Chevrolet Equinox



2023 Ford Escape



2023 Honda CR-V



Original vehicle-to-vehicle
front crash prevention rating

2023 Jeep Compass



2023 Mazda CX-5



2023 lander



2023 Subaru Forester



2023 Toyota RAV4



2023 Volkswagen Taos



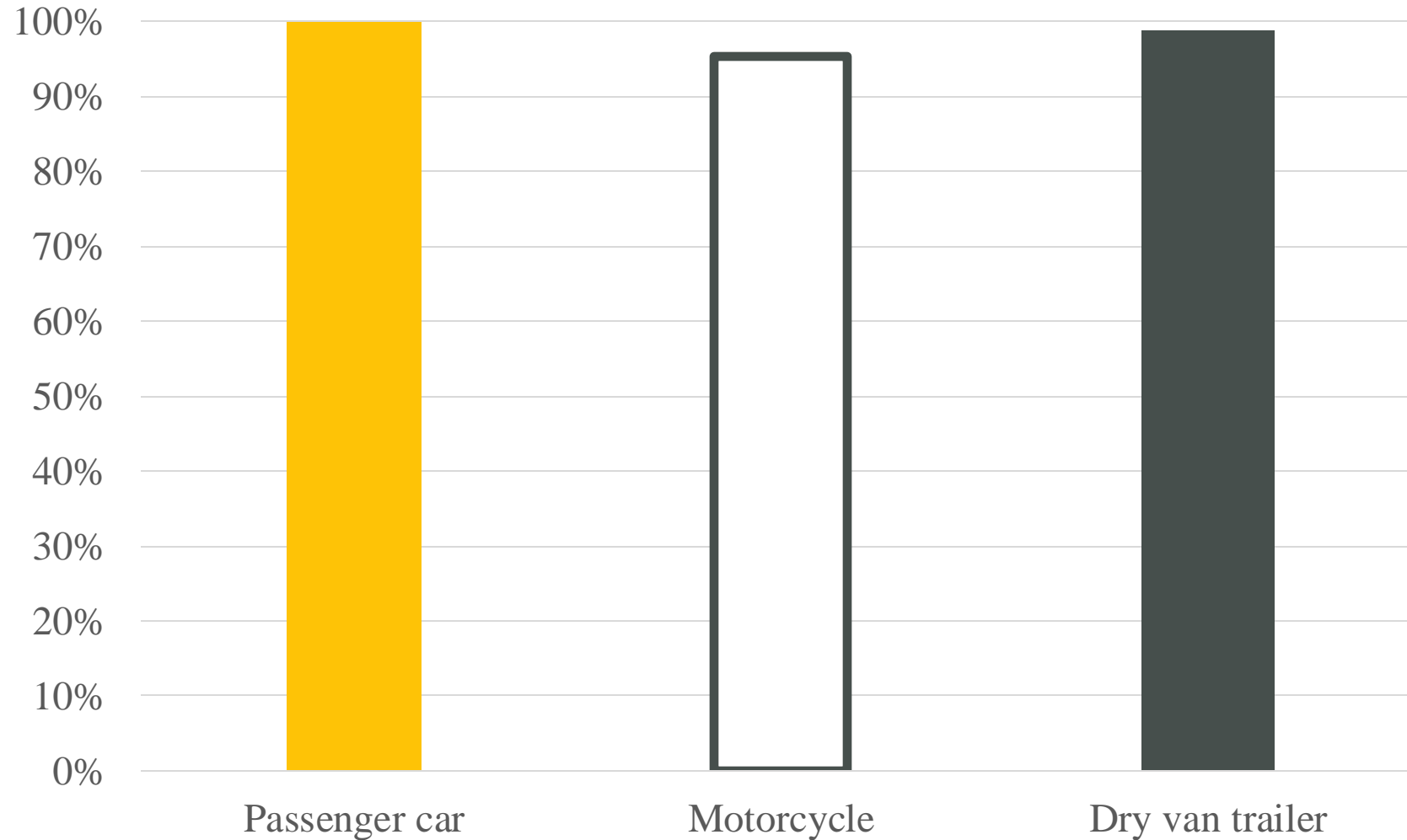
Small SUV results

Percent of available points for FCW

	Passenger car	Motorcycle	Dry van trailer
All small SUVs	78	48	80
2023 Subaru Forester	100	100	100
2023 Mitsubishi Outlander	100	100	100
2023 Mazda CX-5	100	33	100
2023 Jeep Compass	83	0	100
2023 Honda CR-V	100	83	100
2023 Chevrolet Equinox	100	17	100
2023 Toyota RAV4	100	50	67
2023 Hyundai Tucson	33	33	67
2023 Ford Escape	67	67	67
2023 Volkswagen Taos	0	0	0

Front crash prevention 2.0 performance to-date

Percent of tests with a FCW by crash partner



[NHTSA notes: The Associate Administrator for Rulemaking has signed the following document and the Agency is submitting it for publication in the Federal Register. While NHTSA has taken steps to ensure the accuracy of this version of the document, it is not the official version. Please refer to the official version in a forthcoming Federal Register publication or on GPO's Web Site. You can access the Federal Register at <https://www.federalregister.gov/>]

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Parts 571 and 596

[Docket No. NHTSA-2023-0021]

RIN 2127-AM37

Federal Motor Vehicle Safety Standards:

Automatic Emergency Braking Systems for Light Vehicles

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This NPRM proposes to adopt a new Federal Motor Vehicle Safety Standard to require automatic emergency braking (AEB), including pedestrian AEB (PAEB), systems on light vehicles. An AEB system uses various sensor technologies and sub-systems that work together to detect when the vehicle is in a crash imminent situation, to automatically apply the vehicle brakes if the driver has not done so, or to apply more braking force to supplement the driver's braking. The AEB system proposed in this NPRM would detect and react to an imminent crash with a lead vehicle or pedestrian. This NPRM promotes NHTSA's goal to equip vehicles with AEB and PAEB, and advances DOT's January 2022 National Roadway Safety Strategy that identified requiring AEB, including PAEB technologies, on new passenger vehicles as a key Departmental action to enable safer vehicles. This NPRM also responds to a mandate

[The FMCSA Administrator and NHTSA Associate Administrator for Rulemaking have signed the following document and submitted it for publication in the Federal Register. While steps have been taken to ensure the accuracy of this version of the document, it is not the official version. Please refer to the official version in a forthcoming Federal Register publication or on GPO's Web Site. You can access the Federal Register at <https://www.federalregister.gov/>]

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Parts 571 and 596

[Docket No. NHTSA-2023-0023]

RIN 2127-AM36

Federal Motor Carrier Safety Administration

49 CFR Parts 393 and 396

[Docket No. FMCSA-2022-0171]

RIN 2126-AC49

Heavy Vehicle Automatic Emergency Braking:

AEB Test Devices

AGENCY: National Highway Traffic Safety Administration (NHTSA), Federal Motor Carrier Safety Administration (FMCSA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This NPRM proposes to adopt a new Federal Motor Vehicle Safety Standard (FMVSS) to require automatic emergency braking (AEB) systems on heavy vehicles, i.e., vehicles with a gross vehicle weight rating greater than 4,536 kilograms (10,000 pounds). This notice also proposes to amend FMVSS No. 136 to require nearly all heavy vehicles to have an electronic stability control system that meets the equipment requirements, general system operational capability requirements, and malfunction detection requirements of FMVSS No. 136. An AEB system uses multiple sensor technologies and sub-systems that work together to sense when the vehicle is in a crash imminent situation and automatically applies the vehicle brakes if

Rear underride guard



1997 Institute study of

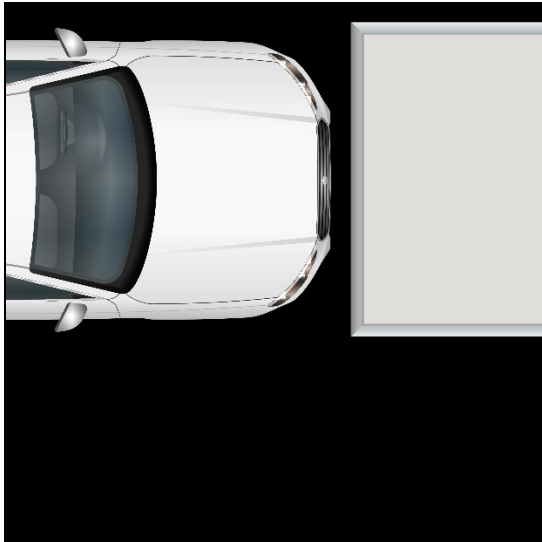
**FATAL CRASHES
BETWEEN LARGE TRUCKS
AND PASSENGER VEHICLES**

estimated

UNDERRIDE = 1/2 of these crashes

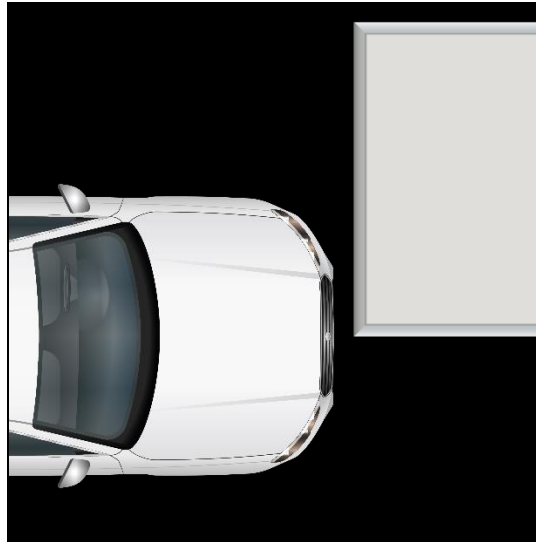
Truck underride guard ratings

In each test, a midsize car traveling 35 mph crashes into the back of a parked semitrailer. The three test configurations are:



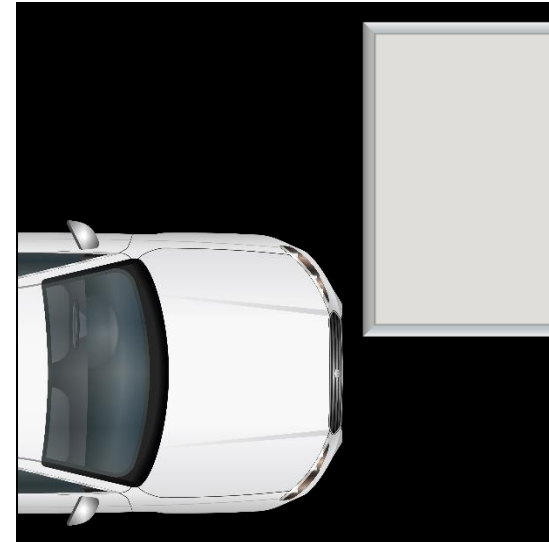
FULL WIDTH

The car crashes into the center of the truck's rear



50 PERCENT OVERLAP

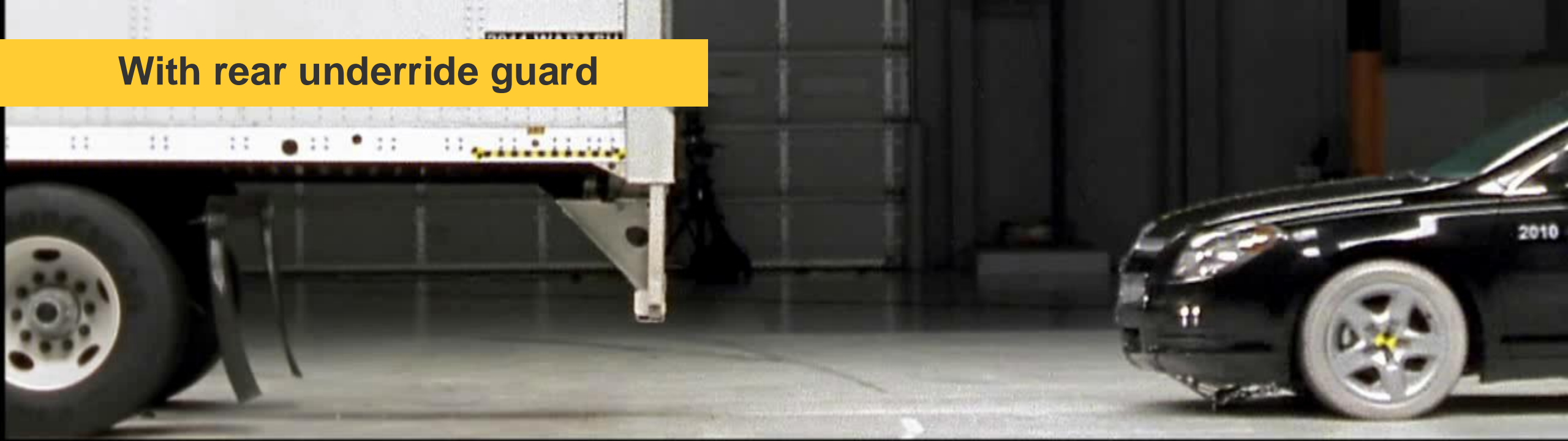
Half the car's width overlaps the rear of the truck



30 PERCENT OVERLAP

Thirty percent of the car's width overlaps the rear of the truck

With rear underride guard



Without rear underride guard



Award winners



Great Dane

Strick

Hyundai Translead

Utility

Kentucky Trailer

Vanguard

Manac

Wabash

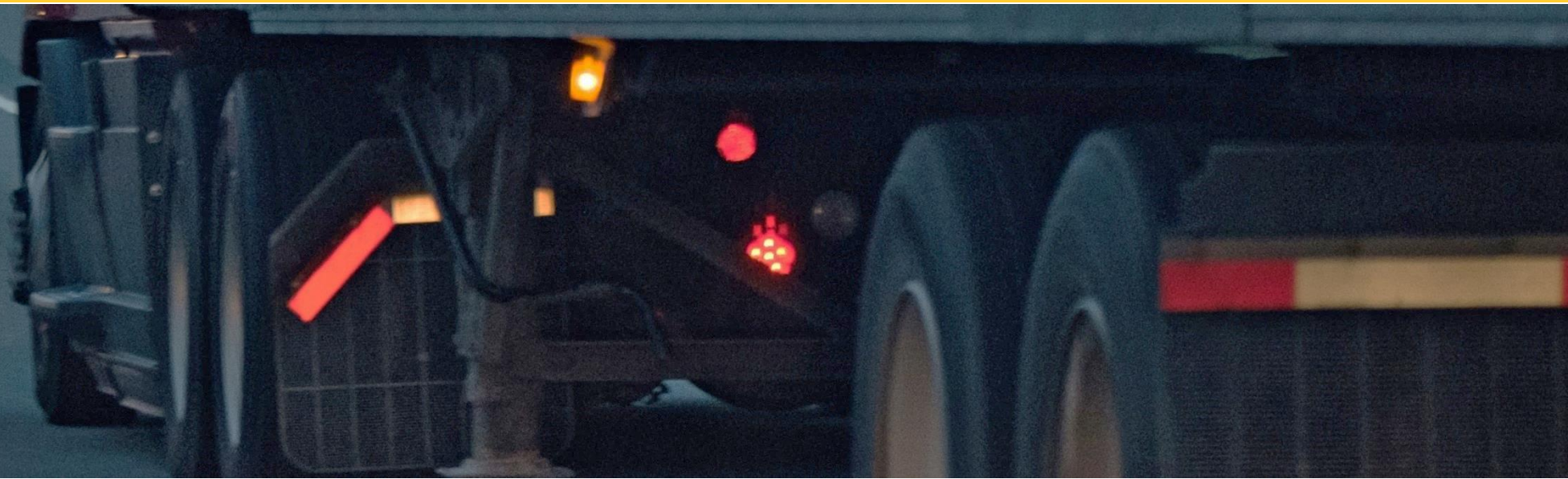
Stoughton

Nine North American trailer manufacturers, including the eight largest, have earned our **TOUGHGUARD** award for good rear underride protection on some or all of their trailers.

TOUGHGUARD road sightings



Conclusions



- ▶ Both FCW and AEB on heavy trucks are associated with strong reductions in crash rates
 - While AEB seems most promising, FCW can be added to existing trucks
 - Increasing the use of these technologies in heavy trucks is a major safety opportunity
- ▶ IIHS testing to ensure FCP systems in passenger cars can deal with heavy trucks and other nonpassenger vehicles
- ▶ Well-designed underride guards that engage partner vehicle structure and protect vulnerable road users can save hundreds of lives annually

Insurance Institute for Highway Safety
Highway Loss Data Institute

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[IIHS](https://www.youtube.com/IIHS)

THANK YOU



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